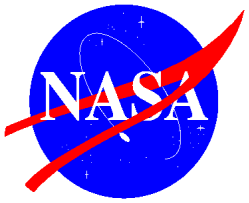

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ED27-SHK-FOP-002
BASELINE
8/3/99

ED27 / VIBRATION, ACOUSTICS, AND SHOCK TEAM

FACILITY OPERATING PROCEDURE

NEFF SYSTEM 490 CALIBRATION AND SOFTWARE VERIFICATION

CHECK THE MASTER LIST—
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Document History Log

Status (Baseline / Revision / Canceled)	Document Revision	Document Date	Description
Baseline		8/3/99	Document converted from ED73-SHK-FOP-002 Baseline. Organizational and document number changes.

1. INTRODUCTION

1.1 Scope. This procedure defines the steps required to calibrate some Category V equipment used by the Pyrotechnic Shock Facility.

1.2 Purpose. This document defines calibration and software verification procedures as required by MPG 8730.5.

1.3 Applicability. This procedure applies to the NEFF System 490 as it is used and as it interacts with Mac/Ran analysis software.

2. DOCUEMENTS

2.1 Applicable Documents

ED27-OWI-M&V-002 Quality Records Control

ED27-SHK-SOP-002 Control of Quality Records in Pyrotechnic Shock

2.2 Reference Documents

MPG 8730.5 Control of Inspection, Measuring, and Test Equipment
Mac/Ran User's Guide
Mac/Ran Application Manual
Mac/Ran Reference Manual
Neff System 490 Operation and Maintenance Manual

3. DEFINITIONS

None

4. INSTRUCTIONS

To start NEFF System 490 software, enter "N" at the C:\. The batch file will start the System 490 program. Adjust the parameters to match the setup in figure 1 and figure 2 below. During the calibration the Channel Configuration, "(3) Channel" and "(5) Full Scale", will need to be reset to the values given in the appendix A tables.

Neff System 490 Configuration

(1)	System number	1 device NEFF1 status ACTIVE
(2)	Sample period	.0000050 seconds
(3)	Recording mode	PRE/POST TRIGGER
(4)	Recording starts	.040240 seconds prior to trigger
	Recording stops	1.25000 seconds after trigger
(5)	Trigger mode	INTERNAL when MORE than +3.0% of full scale
(6)	Memory allocated	252K
(7)	Clock source	INTERNAL
(8)	Filters	Code Frequency Type
		0 10.0 kHz 6 pole Bessel
		1 20.0 kHz 6 pole Bessel
		2 50.0 kHz 6 pole Bessel
		3 100.0 kHz 6 pole Bessel

Figure 1

Neff System 490 Channel Configuration

(1)	Measurement	A1
(2)	System	1
(3)	Channel	01
(4)	Status	ACTIVE
(5)	Full Scale	160. mV
(6)	Filter	50.0 kHz
(7)	Excitation	.000 Volts
(8)	Calibration	Manual
(9)	Cal steps	None
(10)	EU Conversion	g's = .000000 +2.00000 x mV
(11)	Comments	
(12)	Memory installed	1024K

Figure 2

The following calibration/software verification will be done once a year. The calibration portion, which excludes section 4.4, will be performed on a channel if it has been repaired or after the Datatape preventative maintenance. The calibration/verification will be performed when a software or hardware update is installed. Results will be noted on appendix A. Any out-of-tolerances will be adjusted or repaired before use and the procedure will be redone. Out-of-tolerance conditions will be dispositioned in accordance with ED27-OWI-M&V-002. This procedure can be used to document post-

test validation of test data, and the procedure may be modified to best validate the test data.

4.1 Record the information requested in appendix A for the system under calibration and the equipment used for calibration.

4.2 Set “(3) Channel” to the channel number being calibrated and record the serial number in appendix A.

4.3 Set “(5) Full scale” to the value given in appendix A for each case. Apply the input signal given for each case listed and record the results in appendix A.

4.4 File Verification - If Needed

4.4.1 If file verification is needed, setup the NEFF System 490 Data Plot and Export as shown in figure 3.

Neff System 490 Data Plot and Export

(1)	Plot variable 1	A1 - Current Data
(2)	Plot variable 2	-
(3)	EU conversion	ENABLED
(4)	Autoscale	ENABLED
(5)	Plot starting time	.000000 seconds
(6)	Plot ending time	.100000 seconds
(7)	Plot origin	850.000000 G’s
(8)	Plot range	100.000000 G’s
(9)	Export file format	MAC/RAN
(10)	Export file name	NVDT01
(11)	Test	Current Data

Figure 3

4.4.2 Set “(1) Plot variable 1” to the label for the channel being recorded. Set “(6) Plot ending time” to .1 for the DC and 50 Hz data and to .001 for the 10 kHz data.

4.4.3 Save the data for the cases in which file information is to be recorded using the filename “NVDT01” [1] in “(10) Export file name”.

4.4.4 Analyze and print saved data using the verified MACSET and Mac/Ran programs.

4.4.5 Record the results in appendix A.

4.5 Record the “Performed by” and “Date” information in appendix A. Repeat steps 4.2 and 4.3 for each channel being calibrated and record results and information in “Appendix A - Continued”.

5. NOTES

[1] NVDTXXY.SDF is the filename convention used for matching files between NEFF, MAC/RAN and MACSET and is as follows:

NVD - is the 3 letter test designator (Neff Verification Data)
T - is used to divide the filename
XX - is the test number from 01 to 99
Y - is the sequential number automatically given to data files as they are saved. The number is from 1 to 9.
.SDF - is the filename designation for files in the MAC/RAN Standard Data Format
.IFO - is the filename designation for MACSET information files.
.SCF - is the filename designation for files in the MAC/RAN Standard Control Format
.TXT - is the filename designation for MACSET data plot files.
.BAT - is the filename designation for the batch file that starts the analysis

6. QUALITY RECORDS

Appendix A will be completed for each of the channels calibrated/verified, and will be maintained as documented in ED27-SHK-SOP-002

Appendix A

Neff System 490 under Calibration - ECN _____

Voltmeter Brand, & Model _____
ECN _____ Calibration due date _____

Frequency Counter, Brand & Model _____
ECN _____ Calibration due date _____

Neff channel card serial number _____

CHANNEL CALIBRATION AND SOFTWARE VERIFICATION

Neff Full Scale (mV)	Freq. Input (Hz.)	Amplitude	Input Min. (Hz.)	Freq.	Screen Max. (Hz.)	Min.	Screen Amp.	Max
160	DC	+100mV		_____		95mV	_____mV	105mV
320	DC	-200mV		_____		-210mV	_____mV	-190mV
640	DC	+500mV		_____		475mV	_____mV	525mV
640	DC	-500mV		_____		-525mV	_____mV	-475mV
640	DC	0 mV		_____		-5mV	_____mV	5mV
1280	50	0.707 Vrms	47.5	_____	52.5	.95Vpk	_____Vpk	1.05Vpk
2560	500	0.707 Vrms	475	_____	525	.95Vpk	_____Vpk	1.05Vpk
5120	2500	0.707 Vrms	2375	_____	2625	.95Vpk	_____Vpk	1.05Vpk
10240	10000	0.707 Vrms	9500	_____	10.5k	.95Vpk	_____Vpk	1.05Vpk

Noise Floor at 0mVdc:_____ mVpk-pk. Tolerance <= 5mVpk-pk

Performed by _____ Date _____

SOFTWARE - FILE VERIFICATION

Neff System 490 Software under Verification - Release _____
MACSET Software Version _____ Verification date _____
Mac/Ran Software Version _____ Verification date _____

Neff Full Scale (mV)	Freq. Input (Hz.)	Amplitude	Input Min.	Freq.	File Max.	Min. (g's)	File Amp. (g's)	Max. (g's)
640	DC	0 mV		_____		-10	_____	10
1280	50	0.707 Vrms	47.5	_____	52.5	1900 pk	_____ pk	2100 pk
10240	10000	0.707 Vrms	9500	_____	10.5k	1900 pk	_____ pk	2100 pk

Performed by _____ Date _____

Appendix A - Continued

Neff channel card serial number _____

CHANNEL CALIBRATION

Neff Full Scale (mV)	Freq. Input (Hz.)	Amplitude	Input Min.	Freq. (Hz.)	Screen Max.	Screen Min.	Amp.	Screen Max
160	DC	+100mV		_____		95mV	_____mV	105mV
320	DC	-200mV		_____		-210mV	_____mV	-190mV
640	DC	+500mV		_____		475mV	_____mV	525mV
640	DC	-500mV		_____		-525mV	_____mV	-475mV
640	DC	0 mV		_____		-5mV	_____mV	5mV
1280	50	0.707 Vrms	47.5	_____	52.5	.95Vpk	_____Vpk	1.05Vpk
2560	500	0.707 Vrms	475	_____	525	.95Vpk	_____Vpk	1.05Vpk
5120	2500	0.707 Vrms	2375	_____	2625	.95Vpk	_____Vpk	1.05Vpk
10240	10000	0.707 Vrms	9500	_____	10.5k	.95Vpk	_____Vpk	1.05Vpk

Noise Floor at 0mVdc:_____ mVpk-pk. Tolerance <= 5mVpk-pk

Performed by _____ Date _____

Neff channel card serial number _____

CHANNEL CALIBRATION

Neff Full Scale (mV)	Freq. Input (Hz.)	Amplitude	Input Min.	Freq. (Hz.)	Screen Max.	Screen Min.	Amp.	Screen Max
160	DC	+100mV		_____		95mV	_____mV	105mV
320	DC	-200mV		_____		-210mV	_____mV	-190mV
640	DC	+500mV		_____		475mV	_____mV	525mV
640	DC	-500mV		_____		-525mV	_____mV	-475mV
640	DC	0 mV		_____		-5mV	_____mV	5mV
1280	50	0.707 Vrms	47.5	_____	52.5	.95Vpk	_____Vpk	1.05Vpk
2560	500	0.707 Vrms	475	_____	525	.95Vpk	_____Vpk	1.05Vpk
5120	2500	0.707 Vrms	2375	_____	2625	.95Vpk	_____Vpk	1.05Vpk
10240	10000	0.707 Vrms	9500	_____	10.5k	.95Vpk	_____Vpk	1.05Vpk

Noise Floor at 0mVdc:_____ mVpk-pk. Tolerance <= 5mVpk-pk

Performed by _____ Date _____